

Fertilizer Sizing Mill - Official Technical Overview & Datasheet

EXECUTIVE SUMMARY

The Doebritz Fertilizer Sizing Mill represents a paradigm shift in bulk solid particle reduction for the global fertilizer, chemical, and mineral processing industries. Engineered specifically to address the unique challenges of hygroscopic, abrasive, and corrosive fertilizer compounds (such as urea, DAP, MAP, potash, and NPK blends), this mill integrates low-speed, high-torque granulation control with superior containment. Unlike standard lump breakers, the Doebritz Sizing Mill delivers precise particle size distribution (PSD) for downstream pneumatic conveying, blending, or bagging operations while minimizing dust generation and off-spec fines.

Targeting high-capacity continuous processes in agricultural chemical production, mineral beneficiation, and industrial compounding, the mill provides a critical value proposition: maximizing on-size yield (typically 85-95% within target range) while reducing recirculation loads and energy consumption per metric ton. Its modular design supports ATEX-compliant operation for potentially explosive organic dust atmospheres (e.g., sulfur-coated urea) and NFPA 69 deflagration containment standards.



HOUSING & ROTOR METALLURGY

The heavy-duty housing is cast from abrasion-resistant ductile iron (EN-GJS-400-15) with optional investment-cast 316L stainless steel for high-chloride or acidic fertilizer grades. All wetted surfaces undergo electropolishing to an $Ra \leq 0.8\mu\text{m}$, preventing product adhesion and corrosion pitting. The rotor is precision CNC-machined from solid forged duplex stainless steel (1.4462) or hardened D2 tool steel with tungsten carbide-inlaid vanes, achieving a maximum tip clearance of 0.10–0.25 mm relative to the housing's smooth-bore stator. This micro-clearance delivers superior airlock efficiency ($\leq 0.5 \text{ m}^3/\text{hr}$ of air leakage at 0.5 bar differential) while preventing fibrous or sticky fertilizer build-up. All castings are 100% radiographically inspected and pressure-tested to 150% of maximum operating pressure.

KEY FEATURES

- **Outboard Bearing Isolation:** Bearings are mounted externally in cast iron pillow blocks, separated from the process zone by four-lip PTFE spring-energized seals and an atmospheric vent. This eliminates fertilizer dust ingress and allows hot bearing detection (thermocouple-ready ports).
- **Variable Rotor Geometry:** Interchangeable rotor cassettes (diamond, cage, paddle, or blade profiles) optimize shear control: cage rotors for friable prills, diamond rotors for wet sticky melamine, and blunt blades for hard agglomerated SOP. Rotor speed is adjustable from 15–150 RPM via a vector-duty gearmotor.
- **Hydraulic Drive Overload Protection:** Standard direct-drive gearmotor includes a torque-limiting coupling set to 120% of nominal shear torque. For high-infeed applications, optional hydrostatic drive incorporates a pressure relief valve that reverses rotor direction automatically upon jamming (e.g., tramp metal or caked fertilizer).
- **Rapid Maintenance Access:** Split housing design with quick-release toggle clamps and a swing-away hopper allows complete rotor replacement in under 45 minutes. The sizing screen (perforated plate or wire mesh) slides out laterally without removing inlet or outlet ductwork.
- **Purgeable Shaft Seals:** Dual mechanical cartridge seals with a 0.2 barg dry nitrogen purge (or clean instrument air) prevent fugitive emissions of toxic or odorous fertilizer dust, meeting EPA and OSHA process safety requirements for

ammonia-based compounds.

COMPLIANCE & SAFETY STANDARDS

Doebritz Fertilizer Sizing Mills are certified for global hazardous area installations. Standard compliance includes: ATEX 2014/34/EU for zones 20 (continuous dust), 21, and 22 (Category 1D/2D); IECEx certification for international mining and chemical facilities; NFPA 69 (explosion venting and deflagration isolation) with burst panels rated to 0.5 bar g; and CE machinery directive 2006/42/EC. Optional ABS or DNV marine certification is available for floating fertilizer production units (FPUs). All mills meet OSHA 1910.269 for lockout/tagout (LOTO) with integrated rotor-locking pins and OSHA 1910.212 for machine guarding with touch-temperature surfaces $\leq 60^{\circ}\text{C}$.

TECHNICAL SPECIFICATIONS

The following standard operating parameters apply for urea, DAP, and NPK fertilizer grades at bulk density 0.8–1.2 kg/L. Special configurations available for superphosphate (high free acid) and coated slow-release fertilizers.

Parameter	Specification
Capacity / Volume	0.5 – 150 metric tons/hour

	(dependent on PSD and rotor type)
Flange Standard	DIN EN 1092-1 PN16 / ANSI B16.5 150# RF / JIS 10K
Drive Configuration	Direct drive gearmotor (1.5 – 45 kW, 380-690V, 50/60Hz, IE3) or hydraulic drive (up to 250 bar)
Rotor Clearance	0.10 / 0.15 / 0.25 mm (selectable based on particle friability)
Max Operating Temperature	-20°C to +150°C (with HT seals: +250°C optional)
Max Differential Pressure	0.7 bar (10 psi) standard; heavy-duty 1.5 bar option
Construction Material	Ductile iron GJS-400-15 or AISI 316L (full wetted area), HNBR/FKM/Viton seals

